You Have a Right to Kno

In 1983, the Federal Government established the OSHA Hazard Co
Standard. This standard is designed to protect employees who use
materials on the job.

The Hazard Communication Standard states that companies which
use hazardous materials must provide their employees with informa
training on the proper handling and use of these materials.

You, as an employee, have a Right to Know about the hazardous ma
your work area and the potential effects of these materials upon yo
safety.

Quick Check

As an employee, you have a "Right to Know" about the hazardous ma
your organization.

1. TRUE
2. FALSE

Key Elements of the OSHA Hazard Com
Standard

The OSHA Hazard Communication Standard is composed of five key elements.
These five key elements are:

1. Materials Inventory - A list of the hazardous materials present in your work area.

2. Material Safety Data Sheets - A detailed description of each hazardous material listed in the Materials Inventory.

3. Labeling - Containers of hazardous materials must have labels which identify the material and warn of its potential hazard to employees.

4. Training - All employees must be trained to identify and

The First Step

Hazardous materials (chemical products) everywhere. It has been estimated that ov million chemical products are used by bus industry every year. Some of these chemic pose little danger to you, while others are

Modern manufacturing would not be poss chemicals. However, like machinery or ele equipment, you must know how to use che safely.

The first step in using chemicals safely is those materials that may be hazardous to or physical safety.

What Do I Need to Know?

Employees often ask themselves the following ques

1. How can this material hurt me?
2. What can I do to protect myself?
3. Where can I find the answers to the first two qu

Where to Find the Information Yo

Your most immediate source for information can be found on labe
containers which hold various hazardous materials.

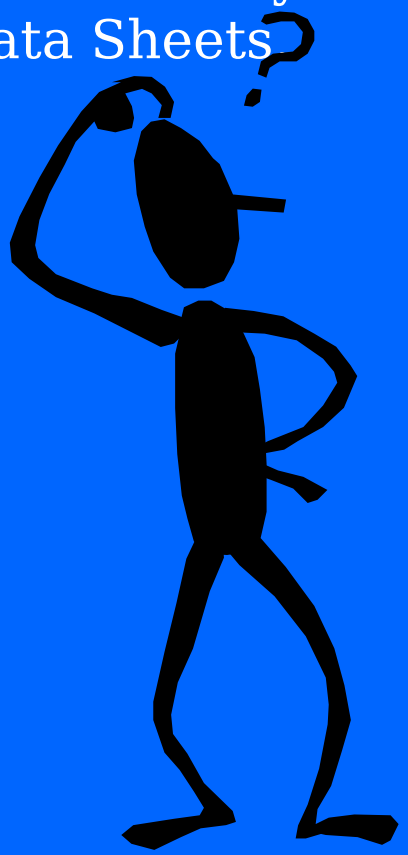
Your second source of information is Materials Safety Data Sheet
Material Safety Data Sheets will be discussed in the next section

Quick Check

Information concerning the hazardous materials you work with ca
container labels and Material Safety Data Sheets

1. TRUE

2. FALSE



What Must Be Labeled

The OSHA Hazard Communication Standard requires that ALL haz
be labeled. Labels must appear either on the container itself, the ba
placard, or the process sheets.

Hazardous chemicals in portable containers which are for the imm
employee who performs the transfer is the exception to this rule.

Quick Check

Only very hazardous materials must be labeled.

1. TRUE
2. FALSE

Basic Label Information

OSHA requires that the following information be included on ALL l

1. The product name;

2. A warning statement, message or symbol; and

3. On commercial labels, manufacturers of hazardous materials m
   name and address. Many manufacturers also include a statemen
   safe handling procedures.

Below is an example of a warning label from a can cement thinner

.

1. A warning statement, message or symbol
2. The product name
3. Safe handling procedures
4. Manufacturer's name and address

WARNING - MAY PRODUCE DAMAGE
TO CENTRAL AND PERIPHERAL
NERVOUS SYSTEMS BY SKIN CONTACT
OR BY INHALING VAPORS.
CONTAINS
n-HEXANE (CAS110-54-3).

Avoid inhaling vapors or skin contact. Use
only in a well ventilated area. When using, do
not eat, drink or smoke. If swallowed, do
NOT induce vomiting. CALL PHYSICIAN
IMMEDIATELY.

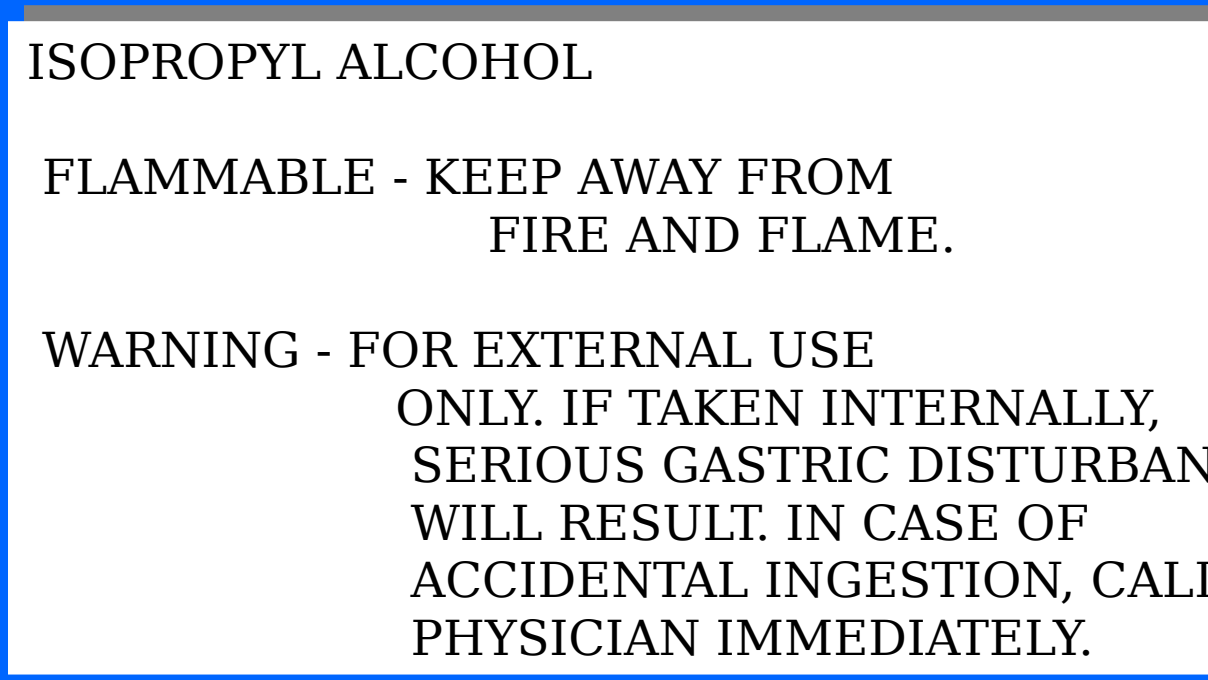
ABC Rubber Cement Company.
Altonia, Ill.

Quick Check

Does the label to the right contain all of the required information for a commercial label?

1. Yes

2. No



Key Words

As you read labels, you will see key words which signal you that you
extra care when handling a particular hazardous material. These ke

CAUTION

MODERATE RISK

WARNING

DANGER

SERIOUS RISK

MAJOR RISK

For example, the key word "DANGER" means:

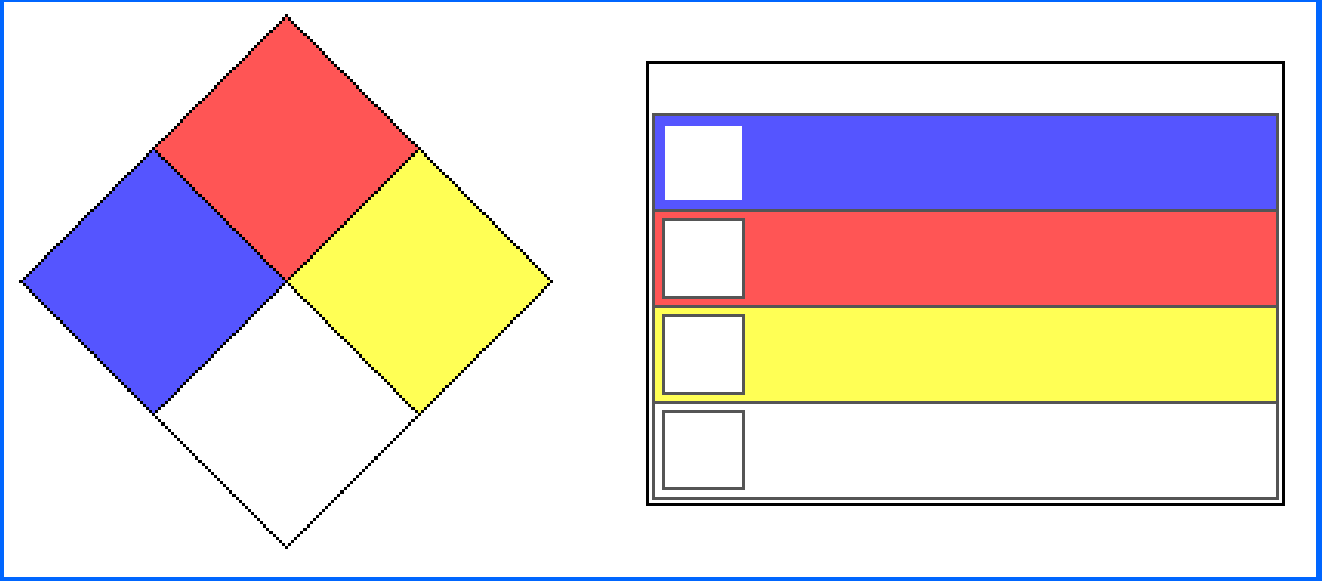
1. Protective equipment and/or clothing is required before use;

2. Misuse can result in immediate harm, long term effects, or death;

3. The chemical may be toxic, corrosive, or flammable.

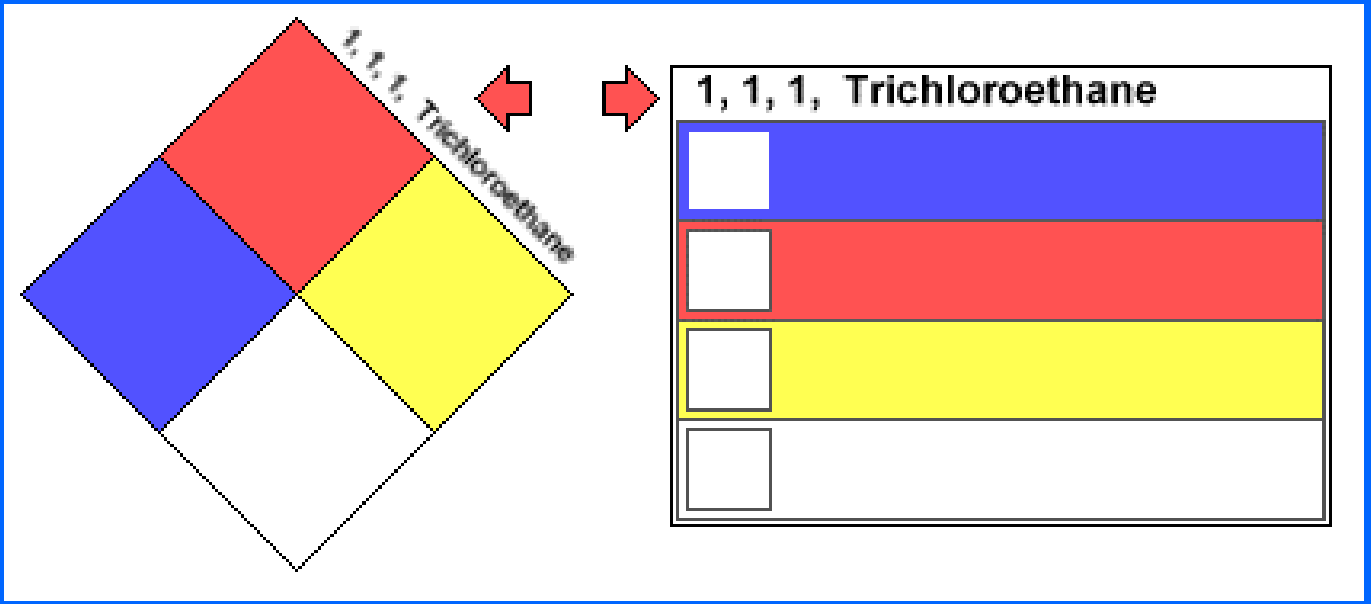
Plant Labels

In addition to commercial labels, many organizations use labels suc
below. Or, your organization may use a specially designed label whi
same information. Contact your supervisor for more information ab
used by your organization.



Chemical Name

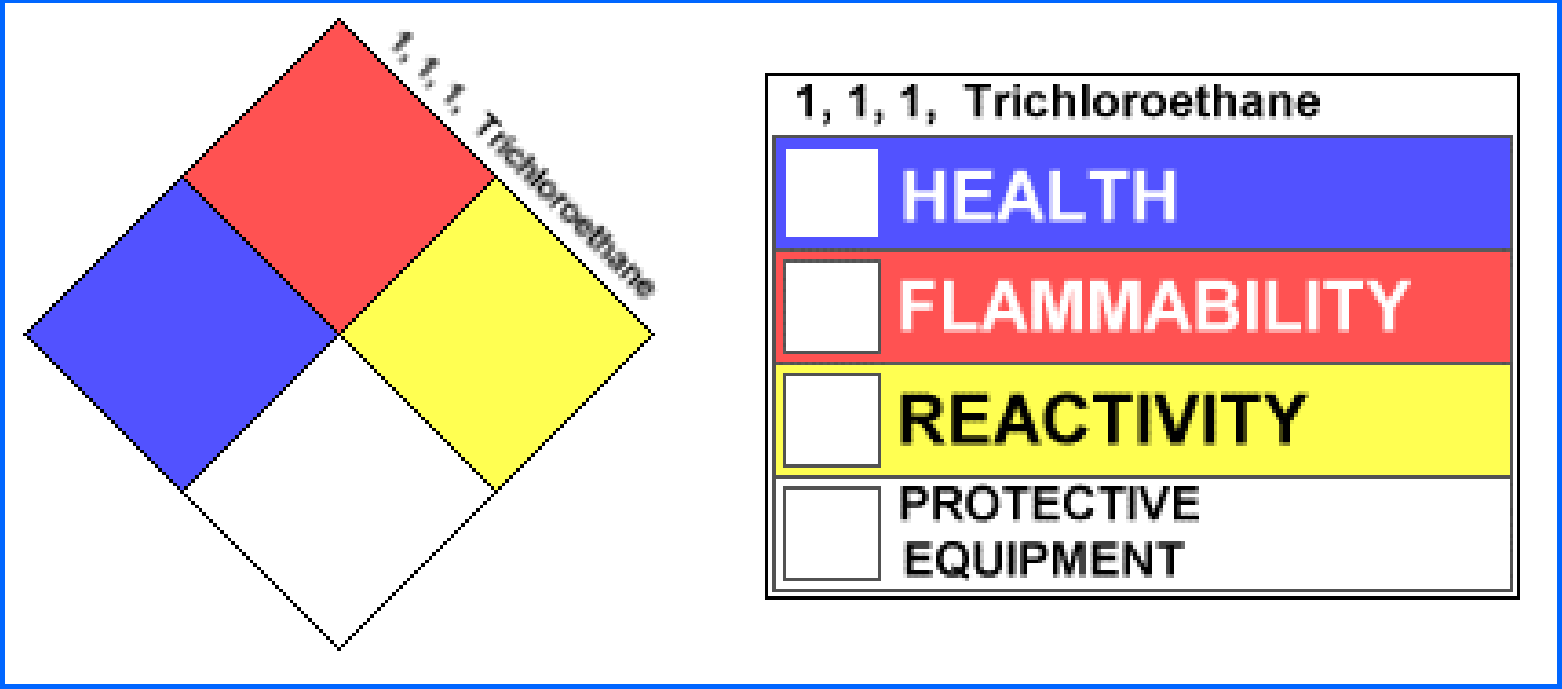
Toward the top of the label will be the chemical trade name of material.



Hazard Class

Each colored bar or small diamond represents a different class of haza
hazard classes found on labels include Health, Flammability, Reactivit
cases, Special Hazards.

Each hazard class uses a different color and a rating scale from 0 - 4.

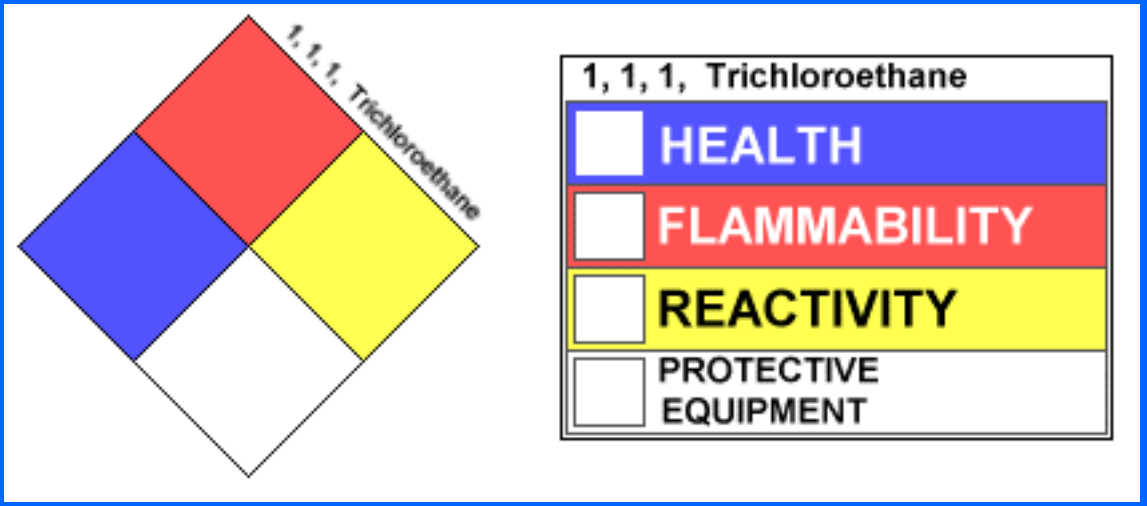


Health Hazards

The first hazard class is Health Hazards. This hazard class is col

The rating scale for Health Hazards is listed below:

0 - No Hazard
1 - Slight Hazard
2 - Dangerous
3 - Extreme Danger
4 - Deadly



Flammability Hazards

The second hazard class is Flammability Hazards. This hazard clas
RED.

The rating scale for flammability hazards is based on the flash poi
The flash point is the temperature at which the material gives off e
sustain ignition.

0 - Will Not Burn
1 - Ignites Above 200 Degrees Fahrenheit
2 - Ignites Below 200 Degrees Fahrenheit
3 - Ignites Below 100 Degrees Fahrenheit
4 - Ignites Below 73 Degrees Fahrenheit

Reactivity

The third hazard class is the Reactivity of the material. This hazard c
YELLOW.

The rating scale for Reactivity is listed below:

0 - Stable
1 - Normally Stable
2 - Unstable
3 - Explosive
4 - May Detonate

Special Hazards

Diamond shaped labels include a fourth hazard class called Special hazard class is colored WHITE.

These special hazards are represented by the following symbols:

- Water Reactive

OX - Oxidizer

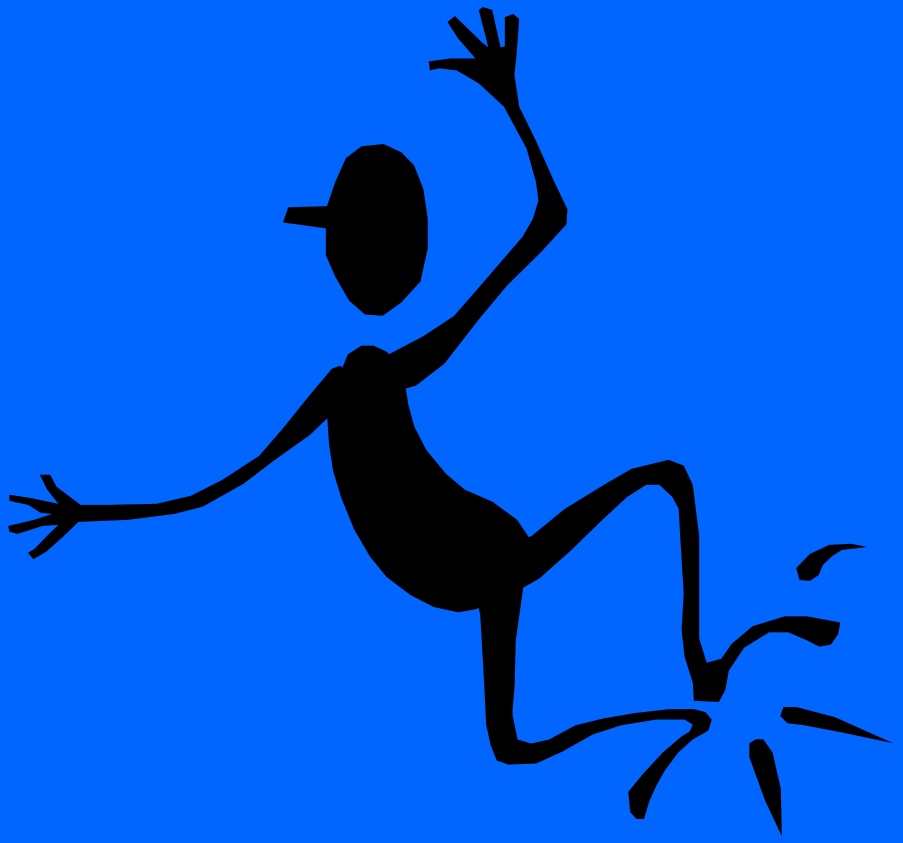
- Radioactive

COR - Corrosive

ACD - Acid

ALK - Alkali

You have completed the Labeling section of Communication course.



Material Safety Data She

While labels are an effective way to display information about hazardo
there will be times when you will want more information than can be i
label.

You can find additional information about the hazardous materials you
what is called a Material Safety Data Sheet, or MSDS for short. You sh
time to read and understand the MSDSs describing the hazardous ma
in your work area.

What is an MSDS?

A Material Safety Data Sheet (MSDS) provides detailed information
hazardous material. An MSDS contains the following information:

Identity (name of substance)
Physical Hazards (target organ)
Health Hazards
Routes of Body Entry
Permissible Exposure Limits (PEL)
Carcinogenic Factors (cancer causing)
Safe-Handling Procedures
Data of Sheet Preparation
Control Measures (personal protective equipment)
Emergency First Aid Procedures (emergency telephone number)
Contact Information (for the preparer of the sheet)
Special Instructions

Sample MSDS Page - Nitric Acid,

This is a sample page from the MSDS for Nitric Acid, 70 percent. Th
made by the ABC Rubber Company, Science Products Division, P.O. B
Altonia, Illinois 40361. Effective date is 8-21-85.

Product identification, synonyms, other names for nitric acid are: a
azotic acid, nitric acid 70 percent. Formula CAS Number 7697-37-2
weight 63.00. Hazardous ingredients, not applicable. Chemical form

Precautionary measures, danger, strong oxidizer, contact with othe
cause fire. Causes sever burns, may be fatal if swallowed. Harmful
not get in eyes, on skin, or on clothing. Avoid breathing mist, use o
adequate ventilation. Wash thoroughly after handling. Do not store
combustible materials. Store in a tightly closed container. Remove
contaminated clothing properly.

Quick Check

Material Safety Data Sheets (MSDSs) contain the following

1. Emergency First Aid Procedures
2. Carcinogenic Factors
3. Contact Information
4. All of the above

What Materials Have MSD

Material Safety Data Sheets are available for ALL of the hazardous materials present in your work area.

Quick Check

Material Safety Data Sheets are NOT available for all of the hazardo
present in your work area.

1. True

2. False

When Do You Use an MSDS

You should use an MSDS whenever y
need additional information about a
hazardous material that is not includ
product label.

For example, you have spilled nitric a
the floor, and you need to know how
clean it up safely. You need only refer
"Safe-Handling Procedures" section o
nitric acid MSDS.

Safe-Handling Procedures Section - Nitric A

The Safe-Handling Procedures section of the Nitric Acid MSDS provides the following information:

Isolate or enclose the area of the leak or spill. Clean-up personnel should wear protective clothing and respiratory equipment suitable for toxic or corrosive fluids or vapors.

For small spills:

Flush with water, and neutralize with alkaline material (soda ash, lime, et cetera). Sewer with excess water.

For larger spills and lot sizes:

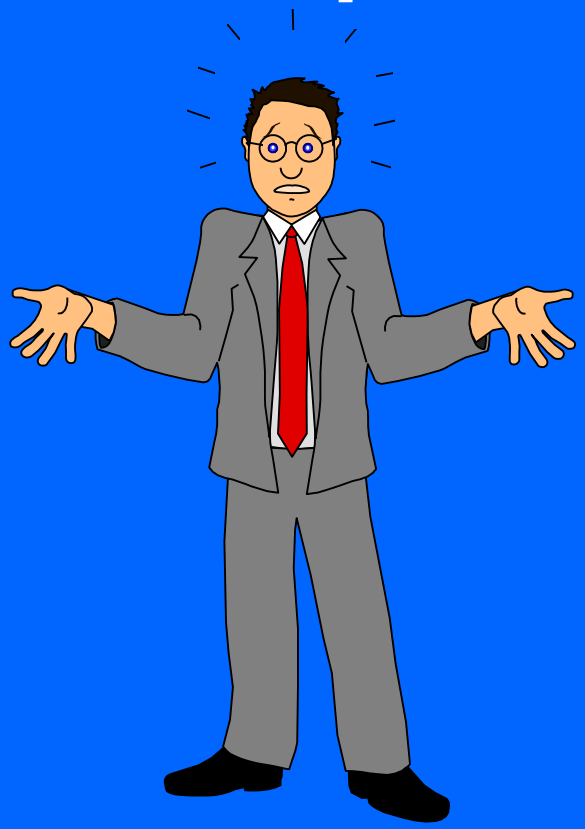
Neutralize with alkaline, pick up with absorbent material (sand, earth, vermiculite) and dispose in a RCRA - approved waste facility or sewer the neutralized slurry with excess water if local ordinances allow.

Quick Check

You should use an MSDS whenever you need additional information
hazardous material that is not included on the product label.

1. True

2. False



When Do You Use an MSD

Some chemicals, such as sodium hydroxide, are very dangerous. If you have an accident, you may not have time to look up the information you need in an MSDS. You should read the MSDSs for the hazardous materials present in your work area before you work with them.

Quick Check

Material Safety Data Sheets (MSDSs) should be referred to whene
information is needed on any hazardous material.

1. True

2. False

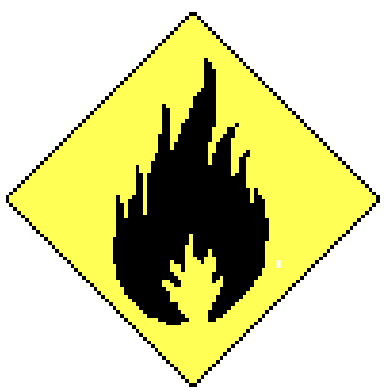
How to Find an MSDS

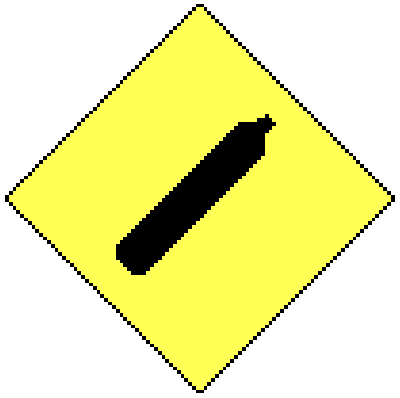
Ask your supervisor or manager where MSDSs are located. Take ti
MSDSs which describe the hazardous materials present in your wo
Remember, knowing where MSDSs are located and how to use ther
responsibility; it is part of your job.

You have completed the Material Safety Data
of the Hazard Communication cours

Physical Hazards

Physical Hazards are one of two major classes of hazardous materia
the OSHA Communication Standard. The other major hazard class is
Hazards. In this session, we will be looking at various types of physi
what you need to know to use these materials safely. To help you ide
which are physical hazards, the symbols shown below are often used





What is a Physical Hazar

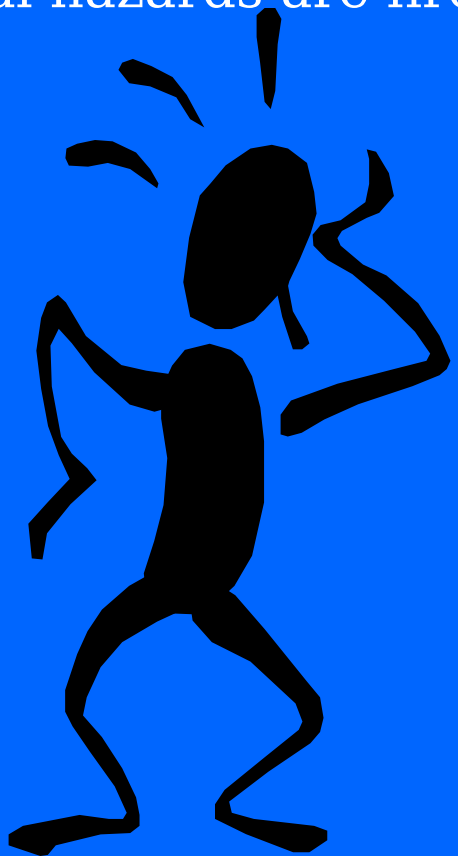
Physical hazards are those substances which threaten your physic
most common types of physical hazards are:

* **Fire**
* **Explosion**
* **Chemical Reactivity**

Quick Check

The most common types of physical hazards are fire, inhalation, a
reactivity.

1. True
2. False



Materials Which Use the Fire

There are three classes of materials which u fire symbol.

1. Flammables can be gases, liquids Flammables ignite easily and burn Liquid flammables have a flashpoin degrees Fahrenheit.

2. Combustibles are similar to flamm they do not ignite as easily. Liquid have a flash point above 100 degre Fahrenheit.

3. Pyrophoric, or spontaneous comb materials, burst into flames "on the temperatures below 130 degrees F

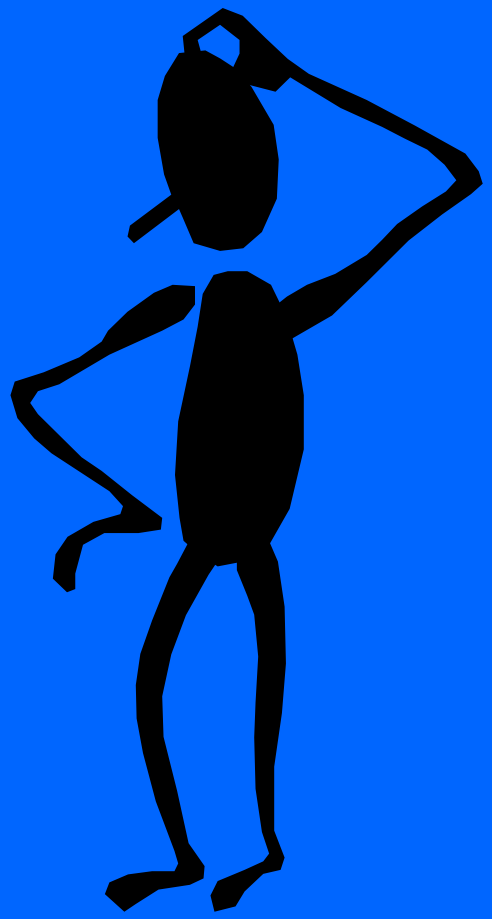
Working with Materials That Use the F

Whenever you work with a material that uses the fire
symbol, be sure to read the warning label and the MSDS for safe handling procedures. With flammables,
combustibles, and pyrophorics, do not expose these materials to sparks, flames or other heat sources. You
must als atch or flame near them.

Quick Check

Liquid flammables ignite more easily than do liquid co

1. True
2. False



Materials That Use the Explosive S

1. Explosives are materials which release a tremendous amount of energy in the heat, light and expanding pressure w very short period of time.

2. Water Reactives react with water ar explode, or they may release a gas w flammable.

3. Unstable Reactives are chemicals th react or can become self-reactive wh subjected to shock, pressure or temp

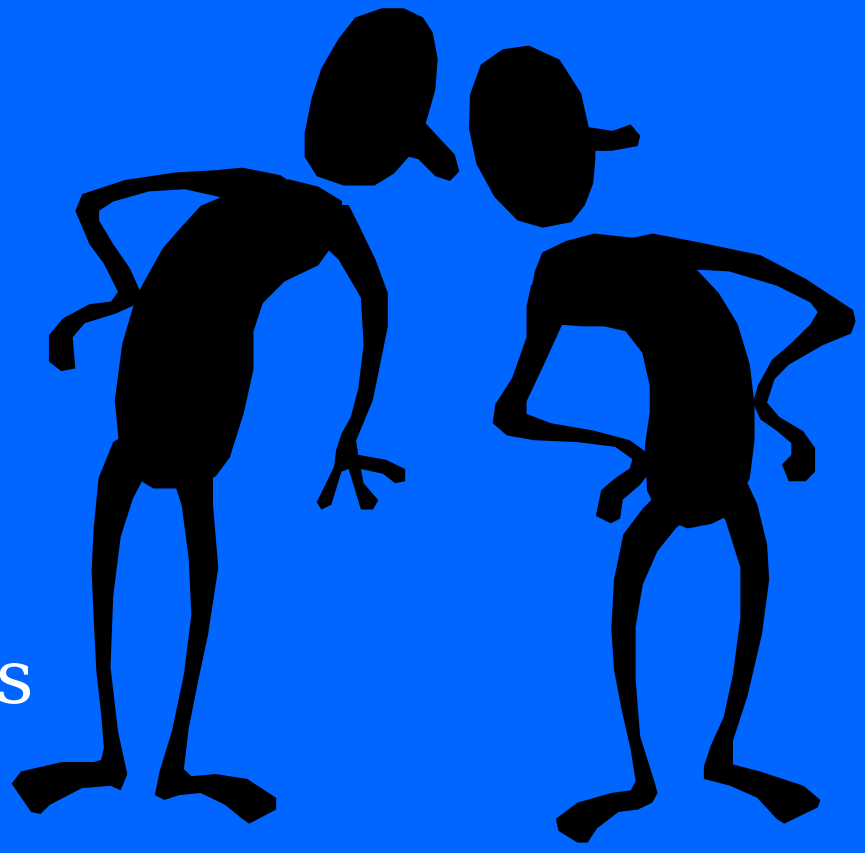
Working with Materials That Use the Explosi

Whenever you work with a material that uses the explosive symbol, be sure to read the warning label or the MSDS for safe handling procedures. Because materials that use the explosive symbol are often very dangerous to work with, you may need additional training or instructions from your supervisor. Always check with your supervisor before handling or using materials that use the explosive symbol.

Quick Check

Which of the following material classes should NOT use an Explosiv

1. Explosives
2. Flammables
3. Water Reactives
4. Unstable Reactives



Materials That Use the Flaming "O"

1. Oxidizers cause other substances to burn more easily through a chemical reaction or change.

2. Organic Peroxides contain oxygen and act as powerful oxidizers.

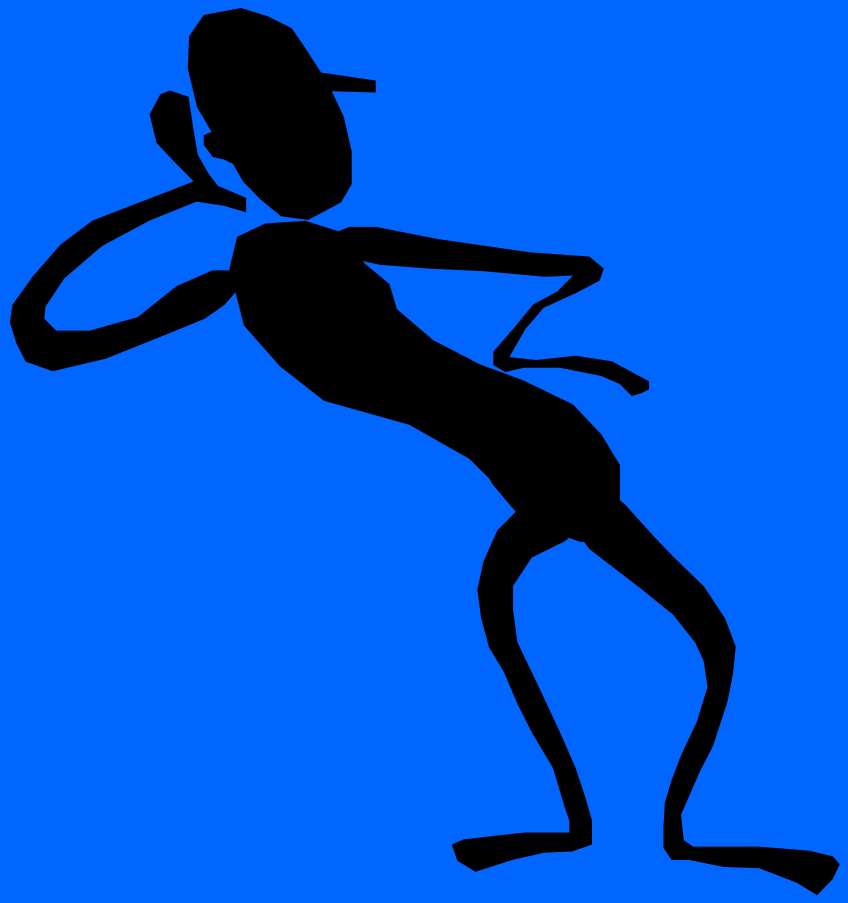
Working with Materials That Use the Flaming "O

Whenever you work with a material that uses
Flaming "O" symbol, be sure to read the wa
and the MSDS for safe handling procedures

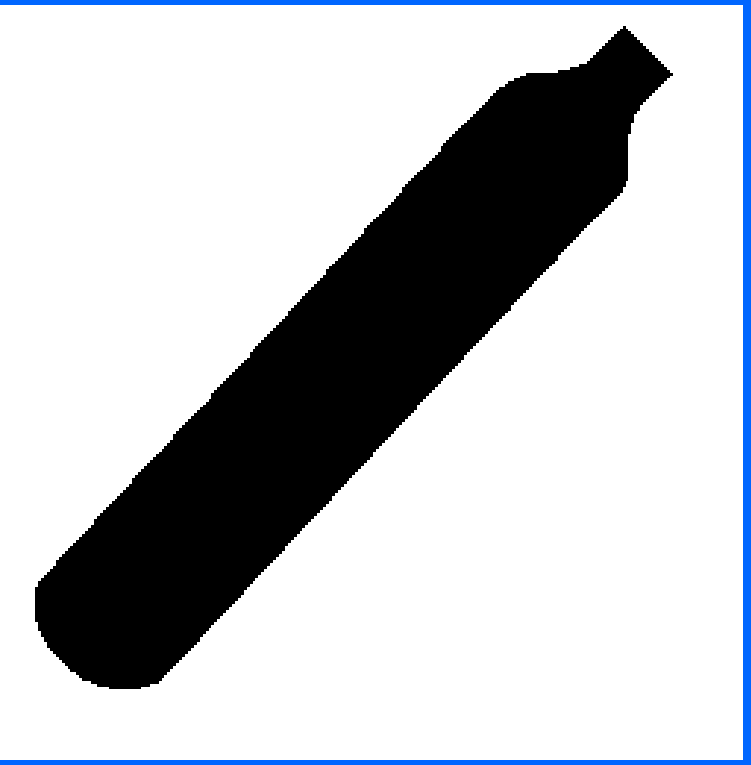
Quick Check

Which of the following material classes should use a Flaming "O" s

1. Organic Peroxides
2. Flammables
3. Water Reactives
4. Acids

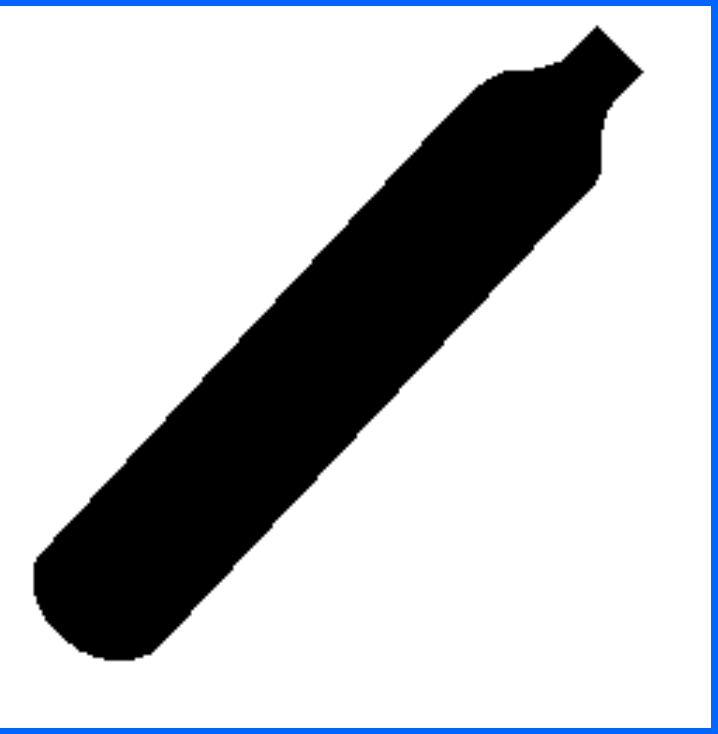


Materials That Use the Cylinder S



Many gases such as nitrogen, oxyg
acetylene are used in the manufac
process. In order to transport, stor
these gases, they are "bottled" und
pressure in tanks called gas cylind

Working with Materials That Use the Cylinde

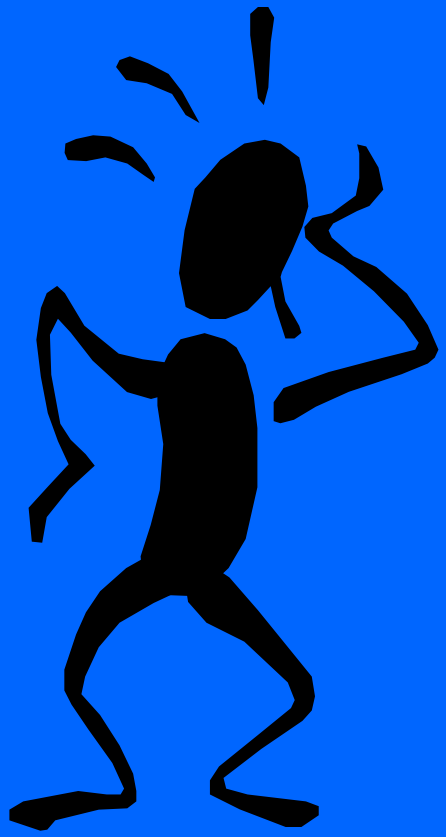


Great care should be taken when you han
gas cylinders to insure that they are not
damaged when they are moved or used. I
addition, you should read the warning lab
and the MSDS for safe handling procedur
concerning the gas contained in a gas
cylinder.

Quick Check

The gas in a gas cylinder is stored under great pressu

1. True
2. False



You have completed the Physical Hazards se
Hazard Communication course.

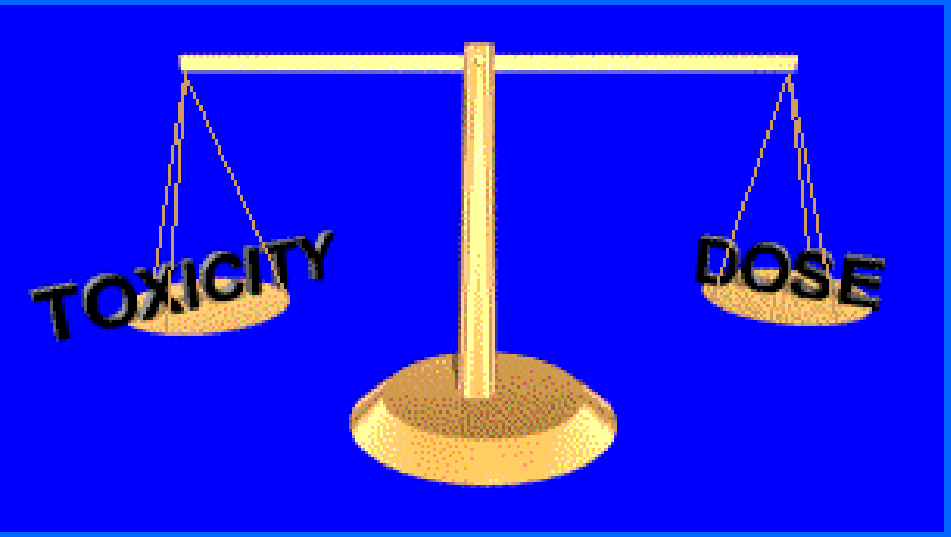
Health Hazards

Health Hazards are one of two major classes of hazardous materia
OSHA Communication Standard. The other major hazard class is P
In this session, we will be looking at various types of health hazard
need to know to use these materials safely. To help you identify ma
health hazards, the symbols shown below are often used.

Toxicity vs. Hazard

The term toxicity is used to describ
ability of a substance to cause a ha
effect. EVERYTHING is toxic at son
dose. Even water! If someone drink
much water at any one time, it can
death.

Toxicity vs. Dose



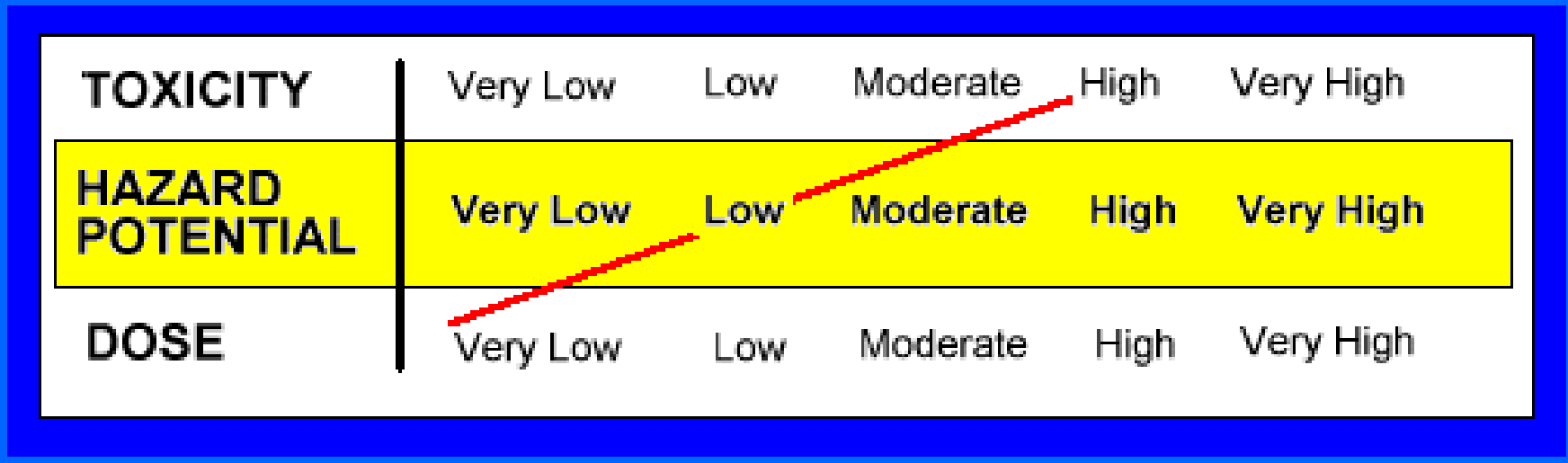
There is a balance between to
and dose. Dose is the AMOUN
something you are exposed to
come in contact with. The less
toxicity, the greater the dose y
tolerate without ill effects. Th
greater the toxicity, the less d
can tolerate without becoming

Hazard Potential

Hazard Potential is the likelihood that a specific chemical or substa
material) will cause an ill effect at a given dose. The following scre
to understand the relationship between toxicity, dose, and hazard p

High Toxicity - Low Dose

For example, acetone is a highly toxic chemical. But you could work
if you were outside or in a well ventilated room where your dose wo
low. As the chart below shows, your hazard potential for working wi
well ventilated room would be low.



Low Toxicity - High Dos

Let's take another example. Nitrogen gas has a low toxic rating. It is
amounts in the air we breathe. However, if you were in a confined sp
only nitrogen gas in it (a very high dose), you would soon die becaus
oxygen. As the chart below indicates, your hazard potential for work
filled with nitrogen would be high.

TOXICITY	Very Low	Low	Moderate	High	Very High
HAZARD POTENTIAL	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
DOSE	Very Low	Low	Moderate	High	Very High

The Most Accurate Way

Hazard potential is the most accurate way to rate how dangerous a
when used under a given set of circumstances. Neither the toxicity
alone provides you with enough information on how to use a hazard
safely. Your real concern must always be with a hazardous material
potential.

Quick Check

Dose is the only factor that determines how a substance might affec

1. True
2. False

Safe Exposure Limits

Much research has been done by government agencies and groups to establish safe exposure limits for the chemicals used in your work area.

These limits are based upon a Time Weighted TWA. TWAs have been established for all the you work with and limit the average amount c you can be exposed to over an eight hour day.

Within the facility, materials which are health monitored on a regular basis to insure that nc overexposed.

Quick Check

TWA is the average amount of a chemical a person can be exposed t
eight-hour day.

1. True

2. False

Acute vs. Chronic

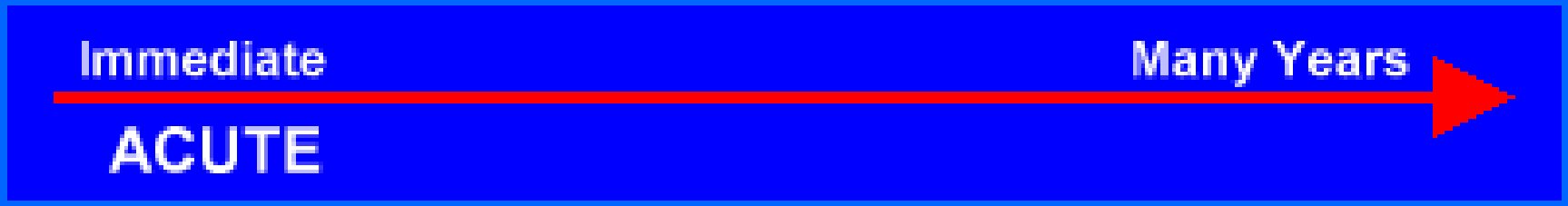
The effects of health hazards are classified as eith

1. Acute
2. Chronic

Acute Health Hazards

Acute Health Hazards are those whose effects occur immediately or
come in contact with them.

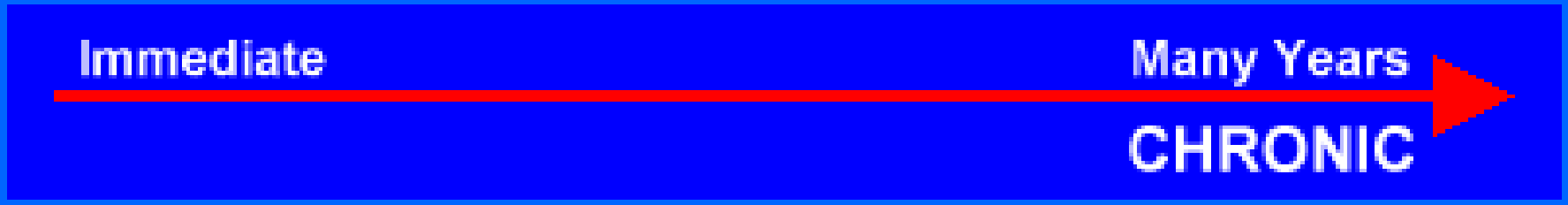
For example, you accidentally spill a strong acid on your hand. The a
to burn your hand immediately. Or, you begin to work with a paint sc
closed area, and the fumes make you feel dizzy.



Chronic Health Hazards

Chronic Health Hazards, on the other hand, are those whose effects
decades to occur after many exposures.

An example of a chronic health hazard would be asbestos. The dang
for people who have been overexposed to asbestos take years to ap
been linked to a number of fatal lung diseases.



Quick Check

Chronic effects develop after many years and repeated overexp

1. True
2. False

Routes of Exposure

It's important to remember that hazardous materials present a heal
when they come into contact with the body. Chemicals can enter the
ways:

1. Inhalation
2. Skin absorption
3. Ingestion

Inhalation

Inhalation is the most common route of exp
most health hazards. This includes breathin
fumes, oil mist, and vapors from solvents ar
gases.

Quick Check

The most common route of exposure in industrial application is

1. Inhalation
2. Absorption
3. Ingestion

Skin Contact

Some chemicals are absorbed into the body thr
contact. If a chemical is readily absorbed into t
then the notation "skin" will appear along with
occupational exposure limits on the MSDS. Cor
chemicals can cause burns and tissue destructi
care must be taken to prevent skin and eye cor
these chemicals. This is why wearing aprons, g
protection, and other protective clothing is imp
working with some chemicals.

Ingestion

It is possible to accidentally eat che
that are health hazards. To insure t
you do not accidentally eat any of t
chemicals you work with:

1. Never eat foods in areas where chemicals are used.
2. Never smoke in areas were chemicals are used.
3. Wash your hands and face with so and water after working with chemicals before you eat, drink, o smoke.

Quick Check

The three ways a chemical can enter the body are ingestion, skin ab
inhalation.

1. True

2. False

Major Types of Health Haza

Any chemical that may be harmful to your health is called a health
following is a brief description of the major types of health hazard

Corrosives - cause tissue damage and burns on contact with the s

Primary Irritants - cause intense redness or swelling of the skin o
but with no permanent tissue damage.

Sensitizers - cause an allergic skin or lung reaction.

Acutely Toxic Materials - cause an adverse effect, even at a very l

Carcinogens - may cause cancer.

Teratogens - may cause birth defects.

Organ Specific Hazards - may cause damage to specific organ sys
blood, liver, lungs, or reproductive system.

Quick Check

Which of the following is NOT a health hazard?

1. Primary Irritant
2. Combustible
3. Organ Specific Hazard

Health Hazard Symbols

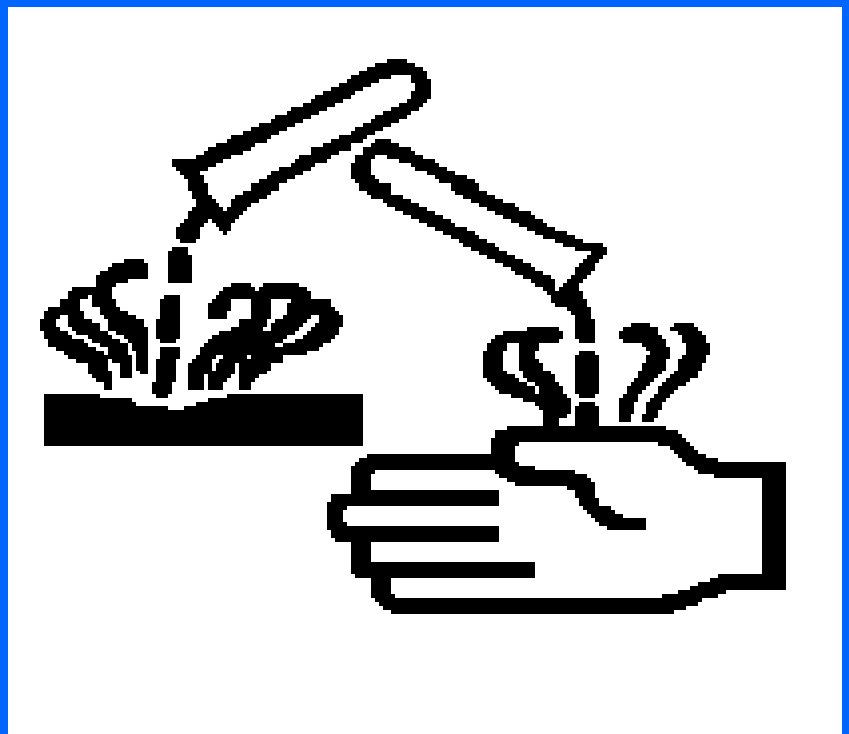
The Medical symbol is a general symbol used to identify materials which are health hazards.

Health Hazard Symbols

The Skull and Crossbones is a symbol that has be
used for centuries. Today it is used to identify
hazardous materials which are poisonous.

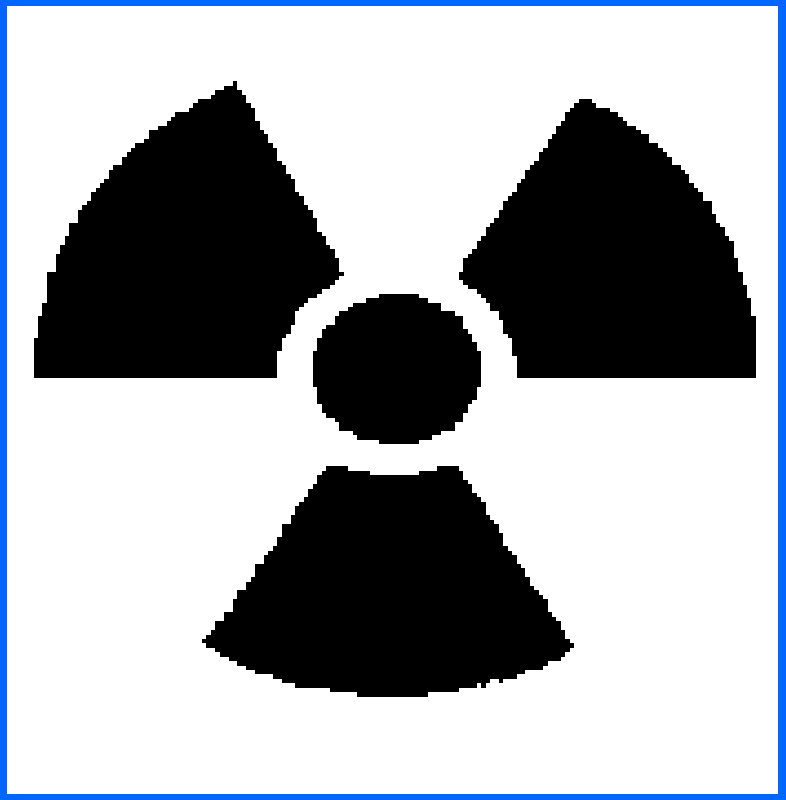
Health Hazard Symbols

This symbol is used to identify materials which are Corrosives. Corrosives cause tissue damage and burns on contact with skin or eyes.



Health Hazard Symbols

This symbol is used to identify materials which are Radioactive.



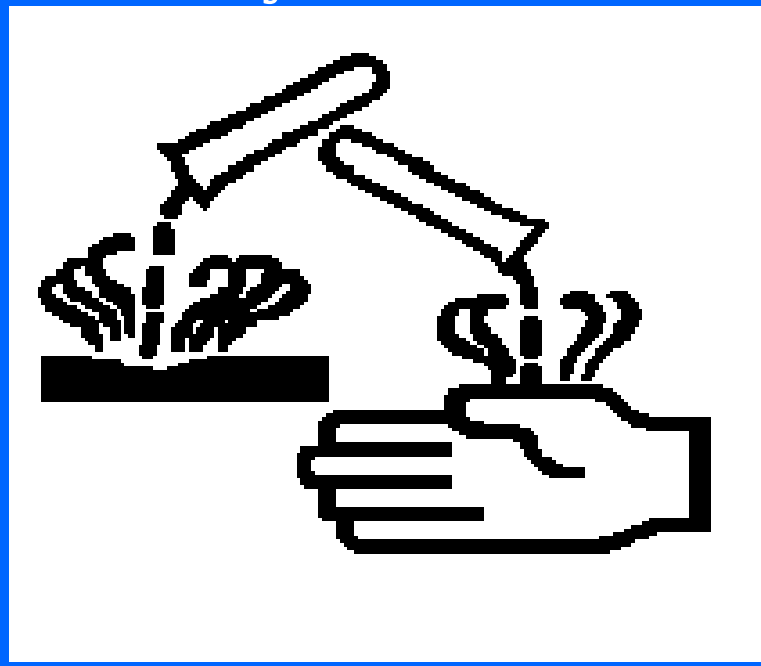
Health Hazard Symbols

This symbol is used to identify hazardous Biologic materials.

Quick Check

The symbol on the right is used to identify:

1. Corrosives
2. Radioactive Materials
3. Explosives
4. Biological Materials



Working with Health Haza

As with materials that are physical hazards, be sure to read all warn
the MSDSs that provide information concerning the health hazards y

You have completed the Health Hazards sec
Hazard Communication course.

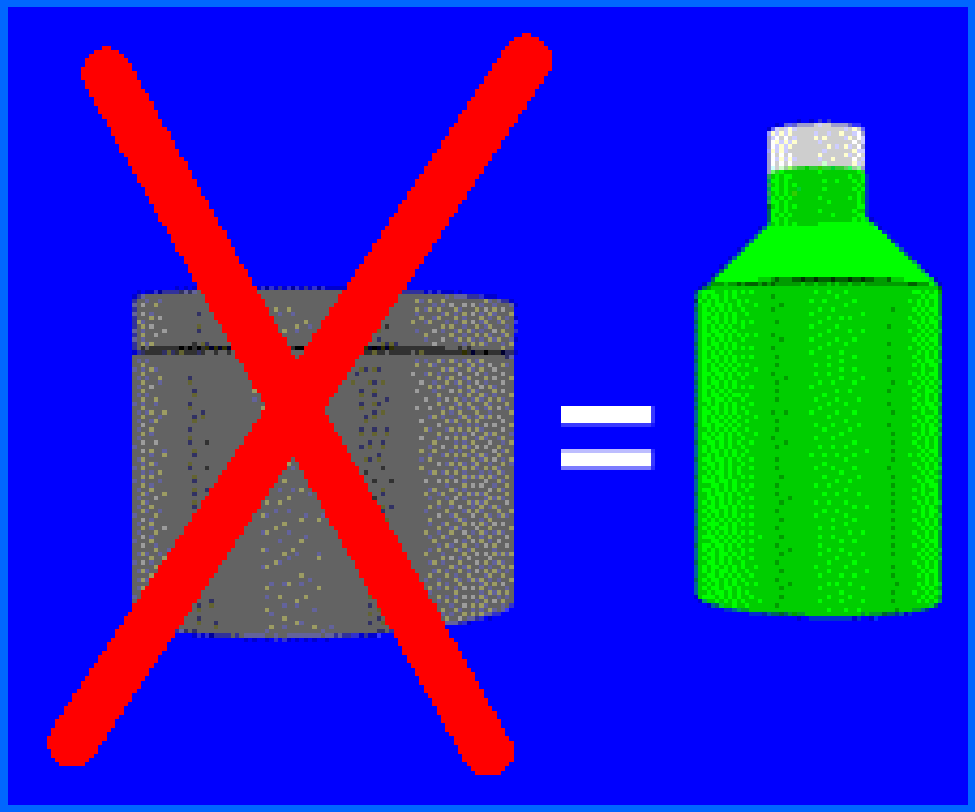
Controlling Physical and Health H

There are a number of ways that you can safeguard your health and
when using hazardous materials. These measures include:

* **Product Substitution**
* **Engineering Controls**
* **Safe Work Practices**
* **Personal Protective Equipm**
* **Training and Communicatio**
* **Environmental Monitoring**
* **Personal Monitoring**

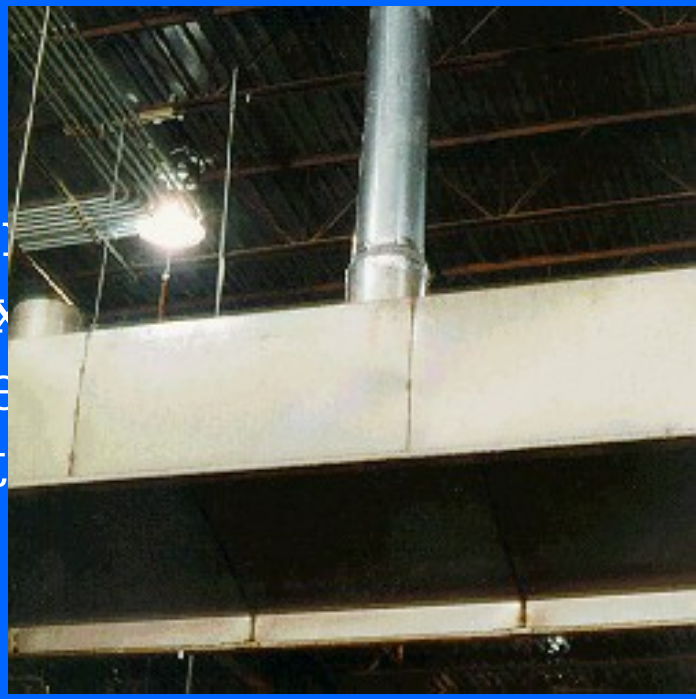
Product Substitution

Because many chemicals do similar jobs, it is important to select ch
good job, while being less toxic.



Engineering Controls

Well designed work areas minimize e
to materials which are hazardous. Ex
engineering controls would include e
systems and wetting systems to cont



Safe Work Practices

Safe work practices will insure that c
are used correctly and safely.

Personal Protective Equip

Masks, eye protection, gloves, apron
other protective equipment and clot
designed to protect you while you w
USE THEM!

Training and Communicat

Knowing how to work safely with chem
that pose a hazard is an important act
is the reason for this training, bulletin
the plant, safety meetings, MSDSs, an
bulletins. You have a right to know, bu
also have a responsibility to use the k
and skills to work safely.

Environmental Monitori

Industrial hygiene personnel regularly samp
air and collect other samples to insure that
hazardous chemicals do not exceed establis
acceptable exposure limits.

Personal Monitoring

Monitor yourself and others. Be on the lookout for a
physical symptoms which would indicate that you or
coworkers have been overexposed to any hazardous
chemical. Symptoms, such as skin rashes, dizziness,
throat irritations or strong odors, should be reported
supervisor.

Quick Check

What protective measures will insure that safe exposure limits are

1. Product Substitution
2. Safe Work Practices
3. Training and Communication
4. All of the above

You have completed the Protective Measures Hazard Communication course.